International Journal of
Digital Rehabilitation & Therapy
e-ISSN:3062-4088
https://ndpapublishing.com/index.php/ijdrt

Management of Early Cervical Disc Desiccation Wıth Severe Hypoplasia in Young Female wıth Pilates Exercise – A Case Report

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Article Info
Received: 24.09.2025
Revised: 16.11.2025
Accepted: 27.11.2025
Published: 30.12.2025

Keywords
Hypoplasia,
Disc Desiccation
Pilates
Young Adult
Maitland

ABSTRACT

The purpose of this case report is to systematically document the physiotherapeutic management and clinical outcomes of a 22-year-old woman diagnosed with early cervical disc desiccation with concurrent left transverse sinus hypoplasia. This report seeks to elucidate the role of structured physiotherapy in addressing persistent neck pain, postural deviation, and the associated biomechanical alterations, thereby contributing to the clinical understanding and rehabilitation strategies for premature cervical disc degeneration. A detailed examination showed trigger points, positive neural provocation indications, muscle weakness (MMT 3/5), and decreased cervical range of motion. Multilevel disc desiccation with loss of cervical lordosis was confirmed by MRI, and left transverse sinus hypoplasia was seen on the MR venogram. Using Pilates-based exercises, myofascial release, cervical mobilisation (Maitland), stretching, TENS, ultrasound therapy, and manual traction, a four-week multimodal physiotherapy intervention was administered. From passive methods to active neuromuscular re-education, the sessions progressed. Significant clinical changes were seen after the intervention: muscular strength increased to MMT 4/5, cervical range of motion improved in all directions (e.g., flexion from 30° to 55°), and pain intensity on the NPRS dropped from 9 to 2. In addition, the patient reported better posture and functional mobility, less frequent headaches, less upper back pain. A structured, multimodal physiotherapy approach has been effective in treating early cervical disc desiccation in a young patient, as observed in this case study. When Pilates was combined with stretching, manual treatment, and electrotherapy, discomfort and functional restrictions were decreased.

1. INTRODUCTION

Disc desiccation, a degenerative condition that is most frequently seen in the cervical and lumbar areas, is defined by the dehydration of the intervertebral discs. In this case, the disc's flexibility and fluid content are significantly reduced, which makes it more difficult for the disc to absorb shock and transfer mechanical loads across the spine.

Ageing naturally causes the intervertebral discs to lose structural integrity and hydration, which impairs their biomechanical function. Disc desiccation may not show any symptoms, even though it frequently coexists with degenerative disc degeneration. However, when symptoms do appear, patients may exhibit tingling, stiffness, muscle weakness, or radiating pain, which is frequently caused by altered spinal alignment and function as well as nerve compression[1].

Disc desiccation commonly plays a role in cervical discopathy, a disorder that involves degenerative changes in the cervical intervertebral discs and can lead to disc herniation in the cervical spine. A vascular abnormality called transverse sinus hypoplasia can have a major impact on cerebral haemodynamic. The transverse sinus is usually underdeveloped or narrowed, which can have an adverse effect on venous drainage. In neurological and radiological examinations, right-sided involvement is less prevalent than left-sided hypoplasia, but it may still be clinically significant [2].

A 22-year-old female right-hand dominant patient complained of upper back pain that had

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How to cite this article

Shetty, N., and Chintamani, R. (2025).Management of Early Cervical Disc Desiccation Wıth Severe Hypoplasia in Young Female wıth Pilates Exercise – A Case Report. Int. J. Digital Rehabilitation & Therapy, 2(1), 20-24.

Research Artıcle / DOI: 10.5281/zenodo.17926808

persisted for 12 months, along with pain in the back of her neck that radiates to her head. Cervical stiffness and decreased mobility were seen along with it. Cervical spine straightening in lateral aspect was observed during the postural evaluation. Grade 2 discomfort was palpable over the cervical paraspinal area, upper trapezius, and suboccipital muscles. There were also muscle spasms and trigger points in the upper trapezius, levator scapulae, and suboccipitals.

According to the assessment, passive cervical extension and rotation caused pain, and resisted movements aggravated the symptoms, which may indicate disc irritation. The results of the neural evaluation showed greater discomfort with cervical flexion and slump positions and restricted movement with a positive ULTT. In contrast to Spurling's test, which indicated worsening symptoms, balanced ligamentous tension testing showed alleviation with distraction. MRI studies confirmed multilevel disc desiccation and cervical lordosis reversal, whereas MR venograms showed left transverse sinus hypoplasia.

The patient showed an apparent improvement in muscle strength and cervical joint mobility after three weeks of structured physical treatment. All cervical mobility planes improved, according to manual muscle testing. The patient experienced a significant decrease in headache frequency and upper back pain, as well as an improvement in posture and alignment and a decreased level of pain.

Clinical results have been demonstrated to be improved by conservative, non-invasive physiotherapeutic management of cervical discopathy. The Kaltenborn and Evjenth Orthopaedic Manual Therapy (OMT) concept of manual therapy, including deep tissue massage and cervical spine mobilisation with traction, is frequently combined with exercise therapy in treatment plans. Conservative care also stresses lifestyle changes, such as proper spinal alignment, ergonomic posture, and adequate hydration, to stop the progression of symptoms and functional decline [1].

2. MATERIALS AND METHODS

2.1. Physiotherapy Exercise Programme

Table 1. Exercise programme

Weeks	Exercises	Repetitions
Week 0-1	1. Myofascial Release: a. Trapezius b. Suboccipitalis Muscle c. Levator Scapulae 2. Manual Cervical Traction 3. TENS 4. Ultrasound	30 strokes 1 set
Week 1-2	1. Pilates Based Breathing Exercises in Crook Lying 2. Maitland Mobilisation Grade 2 3. Stretching a. Trapezius b. Levator Scapulae 4. Myofascial Release 5. Manual Cervical Traction 6. TENS 7. Ultrasound	5 repetitions 3 set
Week 2-3	1. Pilates Breathing in Crook Lying Position Integrated With a) Chin Tucks b) Neck Flexion c) Rotation 2. Active ROM Exercises 3. Maitland Mobilisation Grade 3	10 repetitions 3 sets
Week 3-4	1. Pilates Breathing in Sitting Integrated With a) Chin Tuck with Lateral Flexion b) Chin Tuck with Rotation 2. Cervical Isometrics 3. Active ROM Exercises	10 repetitions 5 sets

2.2. Case presentation:

A 22-year-old female right-hand dominant patient had been experiencing neck and upper back pain for more than a year, along with decreased cervical mobility and radiating headaches. Postural deviations, including straightening of the cervical spine, and musculoskeletal findings, including Grade 2 tenderness, muscle spasms, and trigger points in the cervical and upper back musculature, were found during the clinical evaluation. The functional assessment revealed painful passive cervical extension and rotation, symptom reproduction with resisted movements, and positive neural provocation signs suggestive of disc irritation. Cervical lordosis was reversed, multilevel disc desiccation, and left transverse sinus hypoplasia was confirmed by advanced imaging.

A thorough physiotherapy program was started with the aim of restoring mobility, reducing discomfort, and correcting posture in consideration of these findings. Outcome measurements after four weeks of intervention revealed improvements in muscular strength, cervical joint range, and general symptom relief, including a reduction in upper back pain and headache frequency.

3. RESULTS

3.1. Pain Intensity

A common measure for determining the intensity of pain is the Numeric Pain Rating Scale (NPRS). Using an 11-point scale, with 0 denoting "no pain" and 10 denoting "the worst pain imaginable," it is designed to determine a patient's subjective level of pain at a particular moment.

INTERPRETATION: 1-3 is mild pain. 4-7 is moderate pain and 8-10 is severe pain.

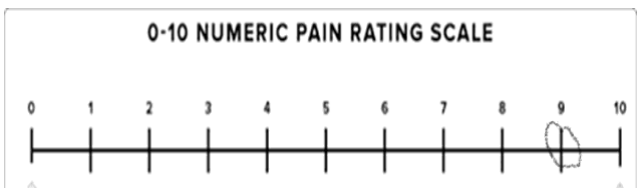

Figure.1. a.: Pre-treatment NPRS

In pre-treatment NPRS, according to figure 1.a. the pain intensity was about 9.

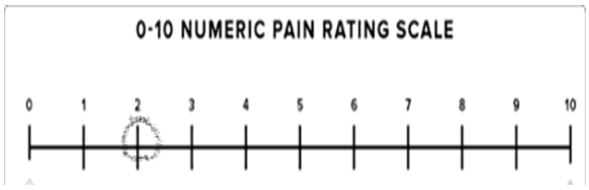

Figure. 1. b.: Post-treatment NPRS

Based on figure 1.b., post treatment NPRS, the pain intensity decreased up to 2.

3.2. Range of Motion

Interpretation

The pre- and post-rehabilitation range of motion (ROM) data for the cervical spine indicate a significant improvement in all directions of movement following the rehabilitation program

Table 2. Post rehabilitation ROM

Cervical joint	Pre rehabilitation ROM
Flexion	0°-30°
Extension	0°-25 °
Lateral flexion	0°- 15°
Rotation	0°- 25°

3.3 Manual muscle testing

Interpretation

The Manual Muscle Testing (MMT) before and after rehabilitation shows improvement in cervical muscle strength across all tested muscle group.

Table 3. Pre rehabilitation MMT (MRC grading)

Muscle	Pre rehabilitation MMT
Cervical Flexors	3/5
Cervical Extensors	3/5
Cervical Lateral flexors	3/5

Table 4. Post rehabilitation MMT (MRC grading)

Muscle	Post rehabilitation MMT
Cervical Flexors	4/5
Cervical Extensors	4/5
Cervical Lateral flexors	4/5

4. DISCUSSION

Chronic neck pain (CNP) is a complex disorder that is affected by psychological variables, muscular imbalances, and bad posture. Several forms of physical therapy have been evaluated in the literature, including stretching, cervical

traction, myofascial release (MFR), Pilates, yoga, and transcutaneous electrical nerve stimulation (TENS). Every strategy contributes differently to pain management, mobility restoration, and increased functional ability.

Pilates has showed effectiveness in improving proprioception, deep neck flexor strength, and cervical posture. Both Pilates and yoga were found to be beneficial in lowering pain and impairment by Uluğ et al., while Pilates was better in enhancing function and posture in CNP patients [3]. Similarly, Picak showed how Clinical Pilates can help patients with persistent, nonspecific neck discomfort by lowering pain, increasing range of motion, and improving quality of life [4].

According to Uzun et al., a combination of cervical mobilisation and Pilates was an effective way to manage cervicogenic headache, a common symptom of CNP, as they observed reduced headache frequency and pain intensity [5].

The use of electrotherapy, especially TENS, is still widespread. Khadilkar's Cochrane study found that TENS offered small advantages for chronic low back pain, and that these benefits might be applicable to neck pain because of comparable nociceptive pathways [6]. In a U.S. survey, practicing therapists deemed cervical traction helpful, mostly for pain management and mechanical decompression [7].

In a randomised controlled trial, Cazotti et al. provided more evidence of Pilates' effectiveness by demonstrating significant reductions in mechanical neck pain and impairment. [8] Myofascial release is one manual therapy approach that helps with symptom relief. The comprehensive study by Ajimsha et al. verified that MFR is useful for lowering pain and increasing range in musculoskeletal disorders, especially those affecting the cervical region [9].

Stretching exercises have also been useful when used in combination with other treatments. Alfawaz et al. showed that in patients with mechanical neck pain, the inclusion of stretching in structured care significantly enhanced pain, disability scores, and cervical range of motion [10]. Overall, a multimodal approach to treating chronic neck pain that includes Pilates, MFR, stretching, and electrotherapy produces positive results. The combined results point towards an integrative strategy that combines manual and physical modalities with Pilates' neuromuscular re-educational benefits for best outcomes.

5. Conclusion

In a young female patient with early cervical disc desiccation and hypoplasia, a multimodal physiotherapy approach combining Pilates, myofascial release, stretching, manual therapy, and electrotherapy improved muscle strength, decreased pain, and increased mobility, resulting in notable clinical and functional improvement

Conflict of Interest

No conflict of interest is declared by the authors. In addition, no financial support was received.

Ethics Committee

The study protocol was approved by the Ethics Committee of the Krishna Vishwa Vidyapeeth, Karad with reference number [KVV/IEC/81/2025]

Author Contributions

Conception and design of the study: SR, SP,SS; Data Collection: SR, SP; Data analysis and interpretation: SR,SP; Drafting the article and/or its critical revision: SP, SSS; Final approval of the version to be published: SR, SS. All authors have read and agreed to the final version of the manuscript.

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